IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	: Jürgen-Michael Weick et al.	Art Unit	: 1725
Serial No.	: 10/632,096	Examiner	: Samuel M. Heinrich
Filed	: August 1, 2003	Conf. No.	: 1914
Title	: LASER PROCESSING MACHINE		

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PENDING CLAIMS IN CLEAN FORMAT

1. (Previously Presented) A laser-processing machine comprising:

a laser that produces laser radiation at a wavelength λ directed to a workpiece and that is associated with one or more operating gases, wherein the one or more operating gases include one or more gases of the gas atmosphere through which the laser is guided, one or more laser-processing machine gases that are used on the workpiece, and one or more supply gases for the laser;

a means for decoupling diagnostic radiation from the laser radiation that is directed to the workpiece, the means for decoupling diagnostic radiation being positioned downstream of the laser and in the path of the laser radiation that is directed to the workpiece to decouple a part of the laser radiation from the laser;

a measuring cell into which a portion of the one or more operating gases to be analyzed can flow, the measuring cell being positioned downstream of the means for decoupling diagnostic radiation to receive the decoupled diagnostic radiation; and

a sound detector for detecting a photo-acoustical effect due to absorption of the diagnostic radiation at the wavelength λ by the portion of the operating gases in the cell.

2. (Original) The laser-processing machine of claim 1, wherein the laser radiation is CO_2 laser radiation.

3. (Original) The laser-processing machine of claim 1, wherein the means for decoupling the diagnostic radiation from the laser radiation includes a means for diffracting laser radiation used for power measurement.

4. (Original) The laser-processing machine of claim 1, wherein the means for decoupling the diagnostic radiation from the laser radiation includes a means for reflecting laser radiation used for power measurement.

5. (Original) The laser-processing machine of claim 1, wherein the means for decoupling the diagnostic radiation from the laser radiation includes a partially-transparent mirror for reflecting laser radiation used for power measurement.

6. (Original) The laser-processing machine of claim 5, wherein the partially-transparent mirror is a rear mirror of the radiation source.

7. (Original) The laser-processing machine of claim 1, further comprising a mechanical means for generating a pulsed diagnostic radiation.

8. (Original) The laser-processing machine of claim 1, further comprising an electronic means for generating a pulsed diagnostic radiation.

9. (Original) The laser-processing machine of claim 1, further comprising a control unit for using a rinsing gas in response to the photo-acoustical effect measured.

10. (Original) The laser-processing machine of claim 9, wherein the control unit is formed for controlling the flow rate of one or more supply gases of the laser processing machine and of working or cutting gases in response to the analysis of a gas atmosphere in feed lines or in a laser beam path.

11. (Canceled)

12. (Previously Presented) The laser-processing machine of claim 1, wherein the one or more laser-processing machine gases are supply gases.

13. (Previously Presented) The laser-processing machine of claim 1, wherein the one or more laser-processing machine gases are cutting gases.

14. (Previously Presented) The laser-processing machine of claim 1, wherein the one or more laser-processing machine gases are working gases.

15. (Original) The laser-processing machine of claim 1, further comprising a filter, wherein the configuration of the measuring cell and the sound detector are adapted for use to monitor the effect of the filter.

16. (Withdrawn) A method for controlling the laser-processing machine of claim 1, wherein in response to the measured photo-acoustical effect, a speed of processing is reduced.

17. (Withdrawn) A method for controlling the laser-processing machine of claim 1, wherein in response to the measured photo-acoustical effect, a speed of processing is stopped.

18. (Withdrawn) A method for monitoring gases, the method comprising:

processing a workpiece including directing laser radiation onto the workpiece;

flowing gas to be analyzed into a measuring cell;

decoupling diagnostic radiation from the laser radiation and directing the diagnostic radiation into the measuring cell; and

detecting a photo-acoustic effect due to absorption of the diagnostic radiation by the gas in the measuring cell.

19. (Withdrawn) The method of claim 18 wherein decoupling the diagnostic radiation from the laser radiation includes diffracting the laser radiation used for power measurement.

20. (Withdrawn) The method of claim 18, wherein decoupling the diagnostic radiation from the laser radiation includes reflecting the laser radiation used for power measurement.

21. (Withdrawn) The method of claim 18, wherein decoupling the diagnostic radiation from the laser radiation includes reflecting the laser radiation used for power measurement with a partially-transparent mirror.

22. (Withdrawn) The method of claim 18, further comprising generating a pulsed diagnostic radiation from the decoupled diagnostic radiation.

23. (Withdrawn) The method of claim 18, further comprising using a rinsing gas in response to the photo-acoustical effect measured.

24. (Withdrawn) The method of claim 23, further comprising controlling the flow rate of one or more supply gases and of working or cutting gases in response to an analysis of a gas atmosphere in feed lines or in a laser beam path.

25. (Withdrawn) The method of claim 18, wherein flowing the gas to be analyzed into the measuring cell includes flowing a supply gas of the laser into the measuring cell.

26. (Withdrawn) The method of claim 18, wherein flowing the gas to be analyzed into the measuring cell includes flowing a cutting gas into the measuring cell.

27. (Withdrawn) The method of claim 18, wherein flowing the gas to be analyzed into the measuring cell includes flowing a working gas into the measuring cell.

28. (Withdrawn) The method of claim 18, wherein flowing the gas to be analyzed into the measuring cell includes flowing a gas from a beam path of the laser radiation into the measuring cell.

29. (Withdrawn) The method of claim 18, further comprising:

suctioning gases from a beam path of the laser radiation including filtering the suctioned gases, and

monitoring the effect of the filter based on the arrangement of the measuring cell and the detection of the photo-acoustic effect.

30. (Previously Presented) A diagnostic machine comprising:

a radiation decoupler positioned downstream of a laser and in the path of laser radiation of wavelength λ that is directed to a workpiece such that at least a portion of the radiation is decoupled from the path of the laser radiation at the radiation decoupler and the decoupled radiation is directed along a new path;

a measuring cell into which operating gas to be analyzed flows, the measuring cell being positioned downstream of the radiation decoupler to receive the decoupled radiation and including an inlet that receives the operating gas to be analyzed from one or more of gases of the gas atmosphere through which the laser is guided, laser-processing machine gases that are used on the workpiece, and supply gases for the laser; and

a sound detector positioned relative to the measuring cell, and configured to detect a photo-acoustical effect due to absorption of the decoupled radiation at wavelength λ by gas in the measuring cell.

31. (Previously Presented) The diagnostic machine of claim 30, wherein the radiation decoupler includes a diffractor that diffracts the laser radiation.

32. (Previously Presented) The diagnostic machine of claim 30, wherein the radiation decoupler includes a reflector that reflects at least part of the laser radiation.

33. (Previously Presented) The diagnostic machine of claim 30, wherein the radiation decoupler includes a partially-transparent mirror that reflects the laser radiation.

34. (Previously Presented) The diagnostic machine of claim 30, further comprising a pulse generator at an output of the laser and in the path of the laser radiation.

35. (Previously Presented) The diagnostic machine of claim 30, further comprising a control unit for using a rinsing gas in response to the photo-acoustical effect measured.

36. (Canceled)

37. (Previously Presented) The diagnostic machine of claim 30, further comprising a filter, wherein the configuration of the measuring cell and the sound detector are adapted for use to monitor the effect of the filter.

38. (Previously Presented) The laser-processing machine of claim 1, further comprising a means for directing the portion of the laser-processing machine gas in the cell to flow back to the laser after it has been analyzed.

39. (Previously Presented) The laser-processing machine of claim 12, wherein the supply gases are supply gases of the laser.

40. (Previously Presented) The laser-processing machine of claim 1, wherein the one or more laser-processing machine gases are laser operating gases.

41. (Previously Presented) The laser-processing machine of claim 40, wherein the laser operating gases comprise CO_2.

42. (Previously Presented) The laser-processing machine of claim 1, wherein the one or more laser-processing machine gases are welding gases or protective gases.

43. (Previously Presented) The diagnostic machine of claim 30, wherein the operating gas to be analyzed is a laser operating gas.

44. (Previously Presented) The diagnostic machine of claim 43, wherein the laser operating gas is CO_2.

45. (Previously Presented) The diagnostic machine of claim 30, wherein the operating gas to be analyzed comprises gas from a gas atmosphere within the laser.

46. (Previously Presented) The diagnostic machine of claim 30, wherein the operating gas to be analyzed is a supply gas of the laser.

47. (Previously Presented) The diagnostic machine of claim 30, wherein the operating gas to be analyzed is a cutting gas or a working gas.